3.0 SITE OVERVIEW

This section provides an overview of the facility layout and security measures, and details background regarding the site location, including the local geography, weather patterns and community demographics.

The Astrotech facility is located in the southernmost part of the City of Titusville, Florida at 28° 31' 30" North Latitude and 80° 49' 12" West Longitude, approximately 3,000 feet south of State Road 405 and adjacent to State Road 407. See Exhibit 3-1.

3.1 Facility Profile

The buildings that comprise the Astrotech facility are divided into non-hazardous and hazardous work areas. It is common industrial practice to localize and segregate operations involving activities in which hazardous materials are handled, to minimize any potential exposure outside of a limited area and to control and limit access. At Astrotech, operations are scheduled to take place in the work area appropriate for the materials being transferred or loaded.

There are 11 permanent employees at Astrotech (including janitorial staff), most of whom have been at the facility since its opening. Security guards are provided to Astrotech under contract.

This section will present a general overview of the buildings that comprise the facility as well as a general description of the safety design features of the buildings in both the non-hazardous and hazardous operations areas. Detailed descriptions of the buildings can be found in Section 4.1.

3.1.1 Buildings

The Astrotech facility opened in April 1984 after a ten month construction period. After the original design and construction, Astrotech identified the need to provide more processing space and to facilitate processing larger spacecraft, and additions were made to Buildings 1 and 2. These additions were completed in May 1989, after a ten month construction period. Additional studies were conducted to ensure that the expansion of Building 2 met explosive siting criteria (See Section 7.1.1). Astrotech also requested and obtained a modification of its Florida DER air permit to allow the handling of larger quantities of liquid propellants on site (See Section 7.1.2).

The facility consists of six buildings and a free standing antenna tower. Buildings 1 and 1A, 4, and 5 are located in the designated non-hazardous area of the site and Buildings 2 and 3 are in the hazardous operations area. See Exhibit 3-2 for a layout of the buildings on the property.

EXHIBIT 3-1 MAP OF ASTROTECH SITE

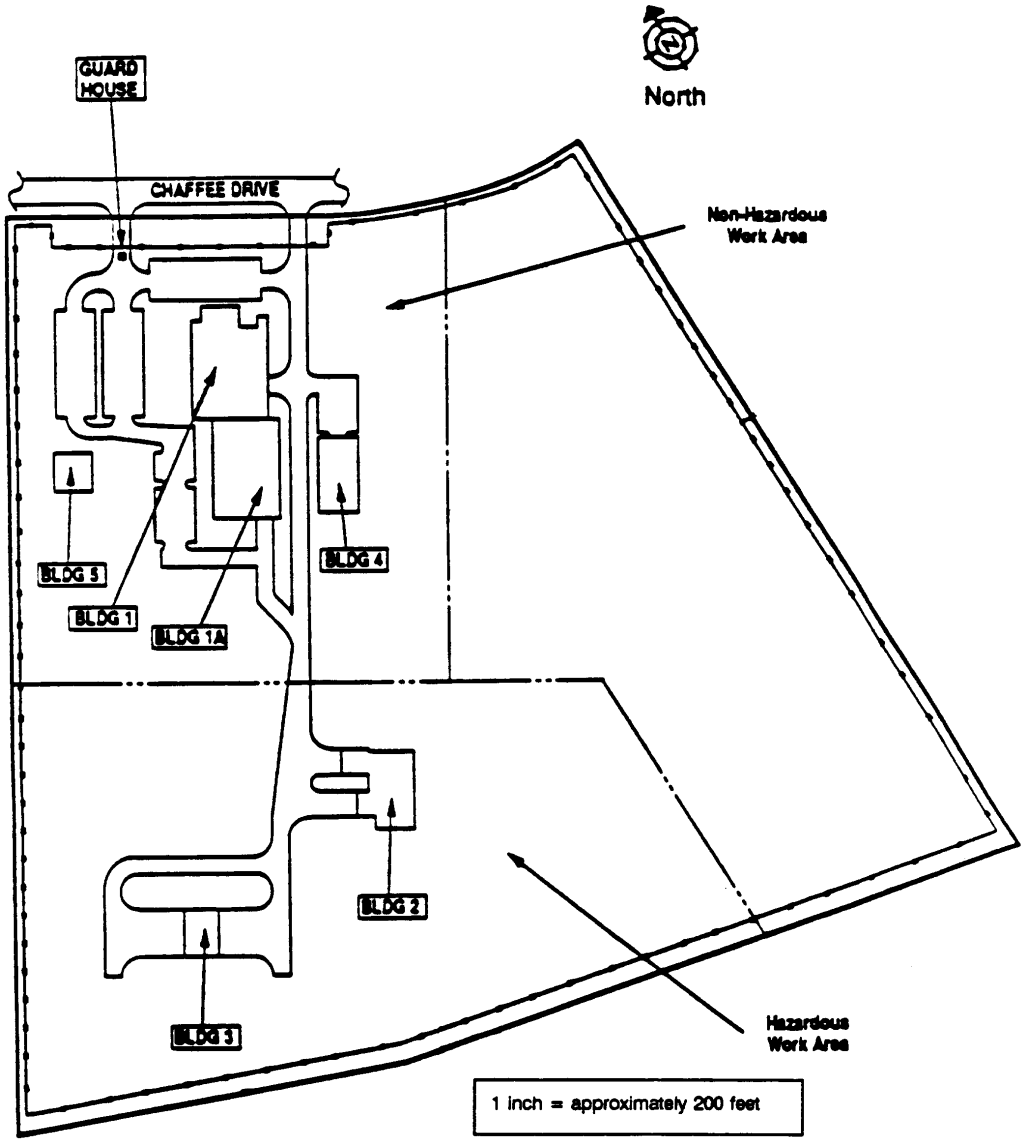
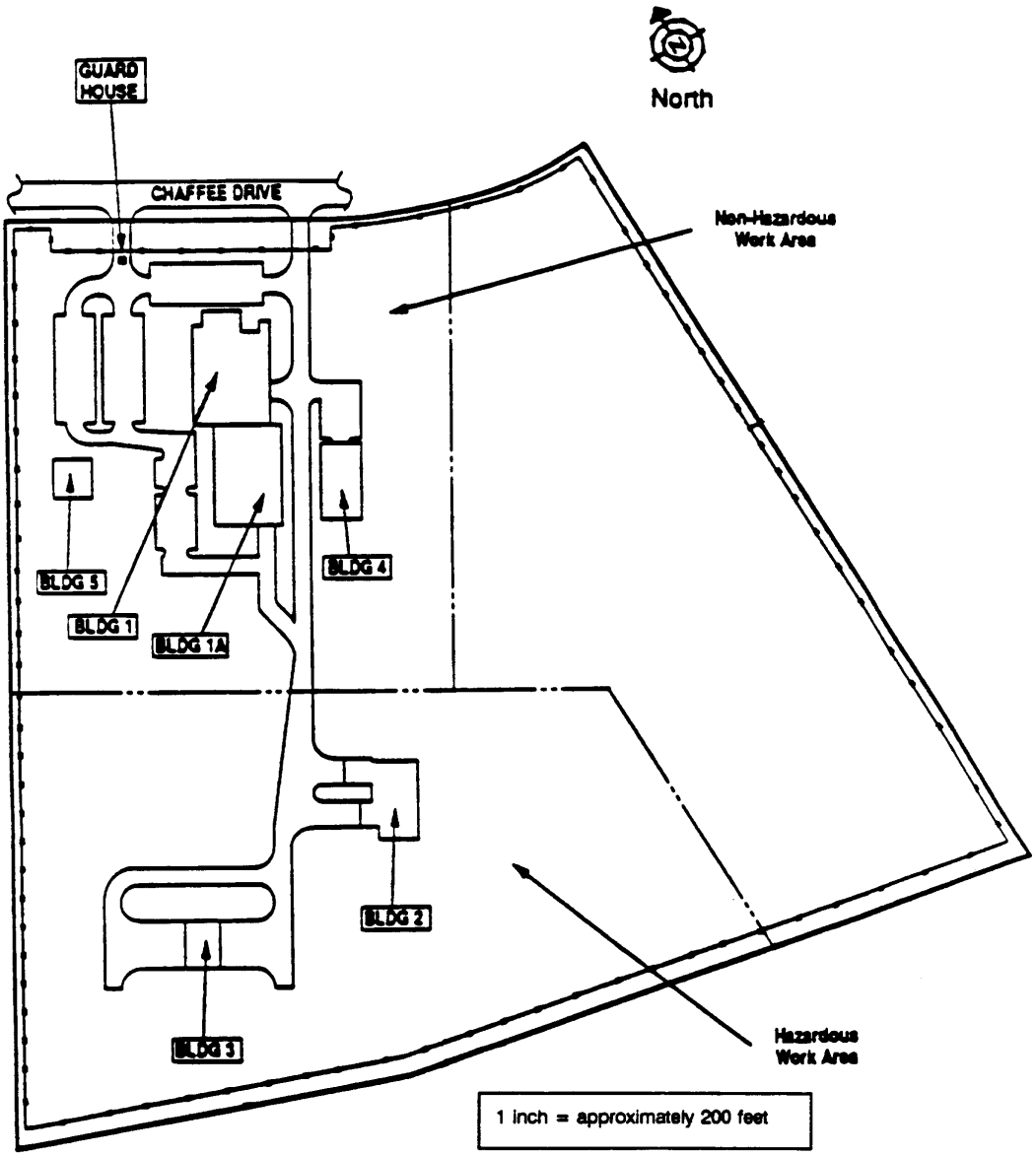


EXHIBIT 3-2 LAYOUT OF BUILDINGS AT SITE



3.1.2 Overview of Facility Design Safety Features

Buildings in the hazardous operations area (Buildings 2 and 3) are constructed with special design features based on the materials and operations that are allowed in each. These are detailed in Section 4.4 and are only briefly mentioned here.

Building 3 is sited and constructed to DoD and ATF explosives safety criteria for storage of solid rocket motors and any other ordnance-containing flight hardware, as required. No liquid propellants are stored in Building 3.

Building 2 is designed to contain a release of propellant vapor or liquid into the environment. The building has a sealed design, which, in the event of a propellant spill, would trap all toxic vapor inside the building and its containment system until it was neutralized into harmless materials. Also, the building is designed to minimize the possibility of igniting propellants. For example, extensive lightning protection, consisting of lightning rods and grounding grids, prevents accidental ignition of materials and damage to equipment. In the unlikely event of a fire or explosion, there are fire protection systems designed and installed to meet strict National Fire Protection Association (NFPA) code requirements. Safe operations are also enhanced by having backup power for critical functions like facility lighting, the fire protection system, and vapor monitors.

3.2 Site Conditions[1]

In performing the safety evaluation, it is important to understand the topography, hydrology, weather, and atmospheric conditions in the vicinity of the site in order to evaluate the effectiveness of the safety features of the facility and also to identify and evaluate operations that may be sensitive to site specific phenomena, such as storms and floods.

3.2.1 Soil, Topography and Hydrology

The soil is predominantly sugar sand with some sea shell fragments to a depth of approximately 100 feet. No shell is evident at the surface, and none was encountered in excavation to approximately ten feet. The upper region of the soil is moderately porous and because of the gently rolling slope, moderately well drained. Vegetation ranges from low grasses to sparse palmetto.

The site is located outside of the one hundred year flood plain, and flooding due to either excessive rainfall (i.e., thunderstorms or hurricanes) or tidal surges is unlikely. The terrain is nearly flat, with a slightly rolling slope of less than ten feet. Because of the site's gently sloped topography and its natural water table of approximately eight feet, rainwater is rapidly absorbed into the ground. Swales or slight depressions in the ground located throughout the facility site also contribute to the rapid absorption of rainwater.

Tidal surge flooding, although possible, is unlikely because the site is more than twenty feet above mean sea level and approximately fourteen miles from the nearest Atlantic beach.

3.2.2 Weather Patterns

There are two major weather seasons: May to October is the wet season and November to April is the dry season. Rainfall, temperature, wind direction and atmospheric stability all vary depending on the season.

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[1] Most of the data in Section 3.2 was taken from Final Environmental Impact Statement for the Kennedy Space Center NASA, October 1979 except for site specific details concerning soils, topography and terrain.

Especially in the wet season, hurricanes and lightning are likely weather patterns, so the facility must carefully monitor the weather before scheduling hazardous payload operations.

Seasonal Temperature and Wind Patterns

The dominant weather pattern in the May to October wet season is characterized by southeast winds that travel around the Bermuda Anticyclone, bringing moisture and warm air, leading to almost daily thundershowers. This season also has the greatest potential for hurricanes. Approximately 70 percent of the average annual rainfall occurs during the wet season. The monthly precipitation average is four inches, with the greatest amount of rainfall in September.

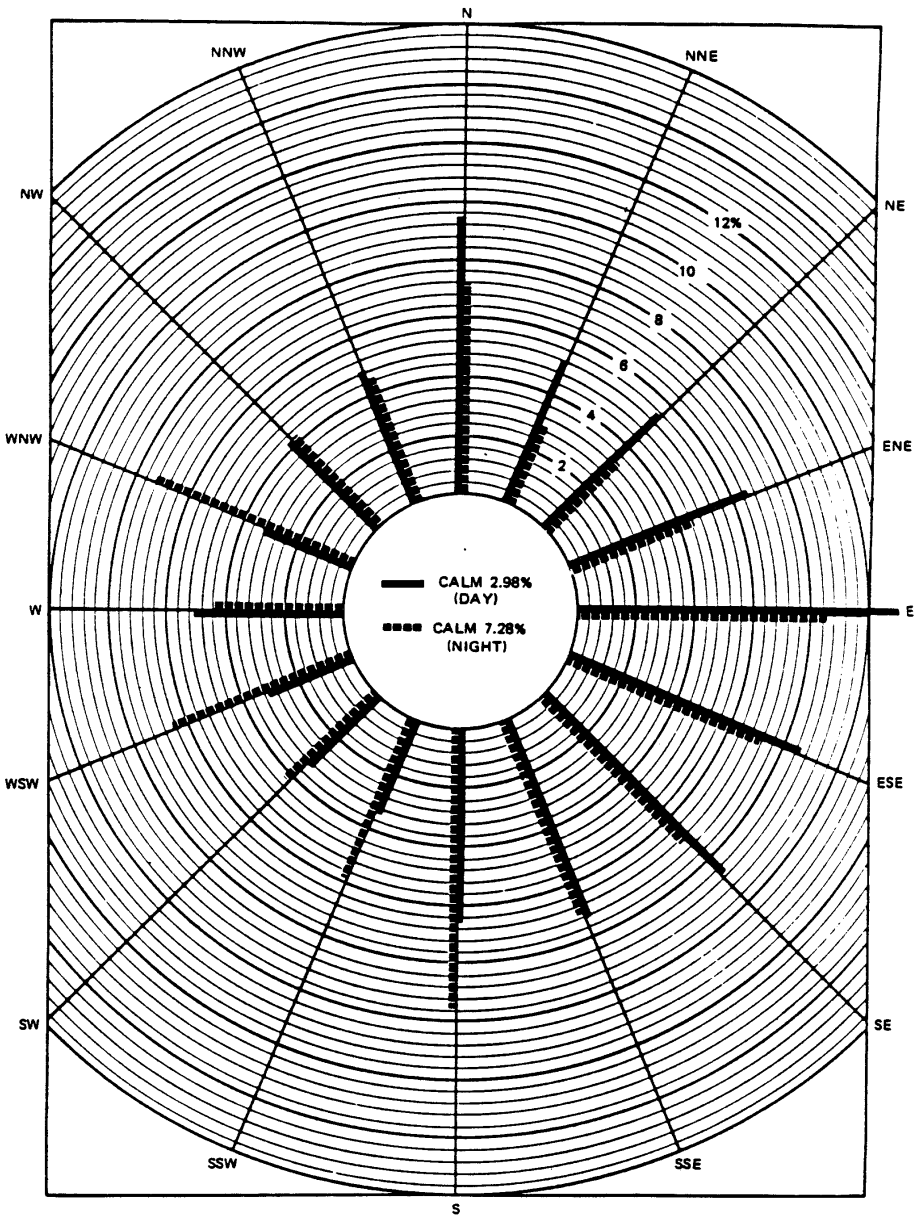
Temperatures during the wet season average 79 degrees Fahrenheit (°F) and rarely exceed 90°F. Relative humidity averages 90 percent in the early morning hours and generally declines to approximately 70 percent by early afternoon.

Weather patterns in the dry season (November to April) are influenced by cold continental air masses that cause rain when they move over the Florida peninsula and meet warmer air. In contrast to the localized, heavy thundershowers of the wet season, rains during the dry season are light and steady, and tend to be uniform in distribution. Total rainfall averages 15 inches for a monthly average of approximately 2.5 inches.

Dry season temperatures average 64°F, but have sharp gradients when the cold air masses move over the area. In the past decade, the temperature has usually not gone below 32°F, and recent winters have had longer cold periods than previously. Relative humidity during the dry season averages 55 percent.

Weather patterns originate from both daily and seasonal wind patterns. Wind directions are influenced by seasonal meteorological conditions and by the thermal differences between the Atlantic Ocean and the Cape Canaveral-Merritt Island-Titusville land masses. Cool air always replaces rising warm air so that during the night offshore (from land to ocean) breezes predominate and during the day onshore (from ocean to land) breezes are most frequent. Exhibit 3-3 illustrates day and night mean wind direction patterns. Onshore breezes can be 3,300 feet and higher, and reach farther inland during the wet season.

EXHIBIT 3-3 DAY AND NIGHT MEAN WIND DIRECTION PATTERNS



Seasonal wind directions are influenced primarily by continental temperature changes. In general, the fall winds occur predominantly from the east to northeast. Winter winds occur from the north to northwest shifting to the southeast in the spring and finally to the south in the summer months. Exhibit 3-4 presents seasonal wind direction distributions.

Atmospheric stability is an indicator of air turbulence, inversely related to the dispersion of gases and particles, and is an important factor in determining the concentration of gases and particles in the air as well as how long they might be present. Stable conditions can result in poor dispersion (e.g., a plume of pollutants would not diffuse and disperse as quickly) and are most likely to occur during the evening hours; unstable conditions provide rapid diffusion and removal of gases and particles from an area. Exhibit 3-5 illustrates the frequency distribution of stability classes by hours of the day. Exhibit 3-6 presents seasonal distribution of atmospheric stability detailing both the wind speed and the percent of time that it occurs. In general, atmospheric conditions are most stable during the winter months.

EXHIBIT 3-6 SEASONAL DISTRIBUTION OF ATMOSPHERIC STABILITY*

Atmospheric Turbulence	Stability Classification	Summer June-Aug 1/	Summer June-Aug 2/	Winter Dec-Feb 1/	Winter Dec-Feb 2/	Annual Average 1/	Annual Average 2/
	Extremely Unstable	1.8	6.3	0.6	4.9	1.1	6.5
High	Unstable	4.4	8.3	1.9	9.2	2.8	9.2
	Slightly Unstable	19.4	10.3	12.9	11.4	15.2	11.2
Moderate 11.0	Neutral		44.9	9.6	40.4	11.4	44.9
	Slightly Stable	21.4	6.9	28.9	9.6	24.6	8.5
Low	Stable	7.3	4.7	12.9	6.7	9.8	6.0
	Extremely Stable	0.8	3.6	2.6	5.8	1.6	5.1

1/ Percent of the time
2/ Miles per hour (wind speed)

* Final Environmental Impact Statement for the Kennedy Space Center, NASA, John F. Kennedy Space Center, October 1979.

EXHIBIT 3-4 SEASONAL WIND DIRECTION DISTRIBUTIONS

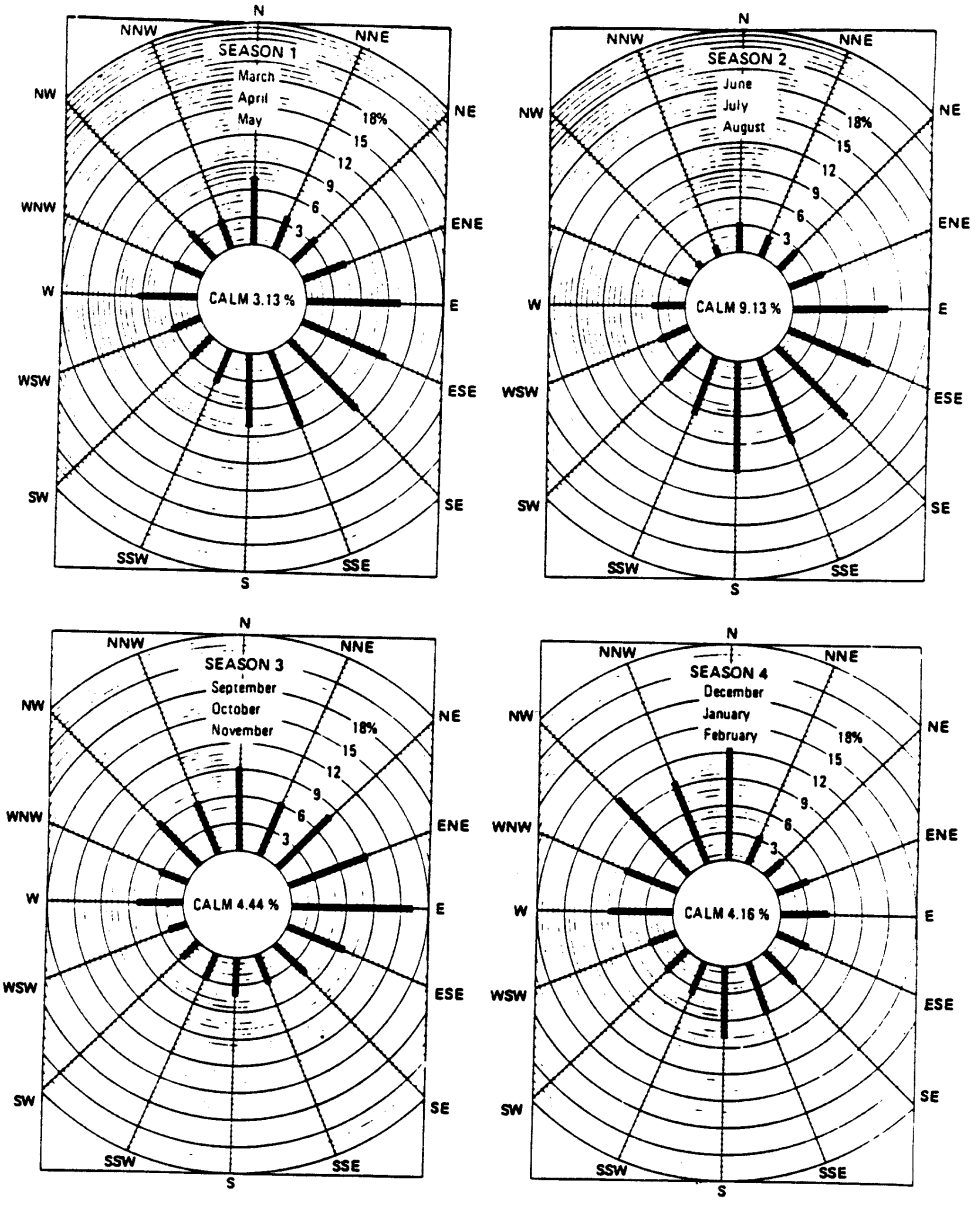
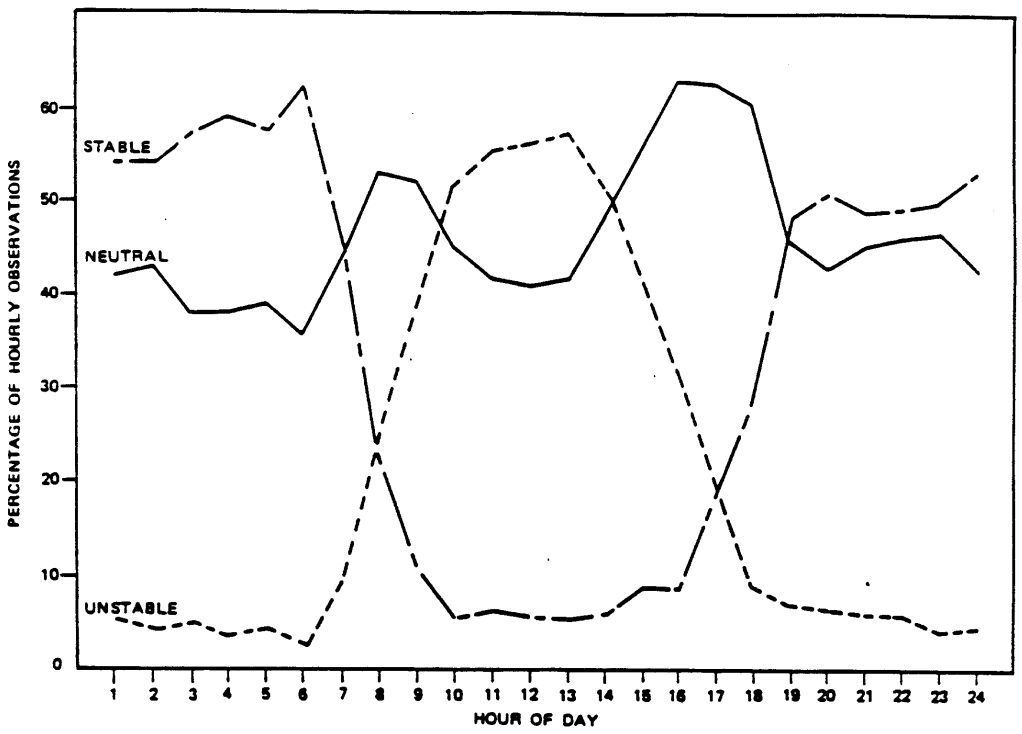


EXHIBIT 3-5 FREQUENCY DISTRIBUTION OF ATMOSPHERIC STABILITY BY HOUR OF THE DAY



3.3 Site Access and Control

All site access routes are publicly maintained roads. The immediate access to the Astrotech site is via Chaffee Boulevard from Grissom Parkway, which is off State Road 405, which extends to the east directly into the NASA Causeway leading to KSC. State Road 405 intersects US Route 1 on the east and joins State Road 50 to intersect with Interstate 95 on the west. Grissom Parkway is the major artery into the Spaceport Florida Industrial Park. See Exhibit 3-1.

Perimeter access is restricted by a chain link fence topped with barbed wire. Access through the main entrance gate is controlled 24 hours a day in order to regulate employee, customer, and visitor traffic through conventional sign in, verification, and numbered badge assignment procedures. Access to operations buildings is restricted by cipher/key locks on all personnel doors and all visitors must be escorted. Other special access restriction could be provided upon customer request. An additional badge exchange guard station limits access to the entire hazardous work area when certain operations are taking place in Building 2.

Liquid propellants are transported to Astrotech from CCAFS/KSC, and, therefore, the transport route is a short one. See Exhibit 3-7. Propellants are transported from the CCAFS Liquid Propellant Supply Depot to Astrotech for fueling payloads, and fueled payloads are transported from Astrotech to launch pads at KSC and CCAFS.

3.4 Demographics of the Vicinity

It is useful to know the population pattern in the immediate vicinity of the Astrotech facility as a baseline for risk analysis. After quantifying specific distance relationships in a hazards analysis, the safety evaluation team can determine the population affected, if any.

The safety evaluation team has made separate estimates of residential and industrial populations within one mile of the Astrotech facility, and has surveyed that area for any specialized concerns, such as ecologically sensitive zones or sensitive facilities (e.g., hospitals, nursing homes, and schools). The one-mile radius was selected to be conservative in evaluating whether the public would be affected (i.e., be more protective of the public), based upon the results of the Brevard County hazards analysis (see Appendix A).

Because the facility is located within the existing Spaceport Florida Industrial Park, there are a substantial number of offices and light industries within a one-mile radius. Daytime office and light industrial population is estimated to be 1,500 individuals, and the evening estimate is 150 individuals.

Based on the 1985 actual data[2], the residential population by quadrant (see Exhibit 3-8 for quadrant locations) is projected for years 1990, 1995, and 2000 in Exhibit 3-9. Each quadrant has a one mile radius. The closest residences to the facility are in Windover Farms, approximately one quarter of a mile west of the facility across State Road 407. No residences are located in the east quadrants.

If a hazardous situation were to arise, certain specialized populations could require additional attention by emergency responders. EPA guidance recommends that a community identify facilities, such as hospitals, nursing homes, schools and parks, so that the community can incorporate their protection into its emergency preparedness planning. No schools, hospitals,

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[2] Brevard County Projections, Populations and Occupied Dwellings, Brevard County Geographic Research Division, August, 1987.

nursing homes or environmentally sensitive areas are known to be within a one mile radius of the Astrotech facility.

EXHIBIT 3-9 PROJECTIONS OF RESIDENTIAL POPULATION BY QUADRANT

	YEAR		
	1990	1995	2000
NE Quadrant	0	0	0
NW Quadrant	750	1065	1344
SW Quadrant	180	327	480
SE Quadrant	0	0	0
Population Total	930	1392	1824

EXHIBIT 3-7 HAZARDOUS MATERIALS TRANSPORTATION ROUTES

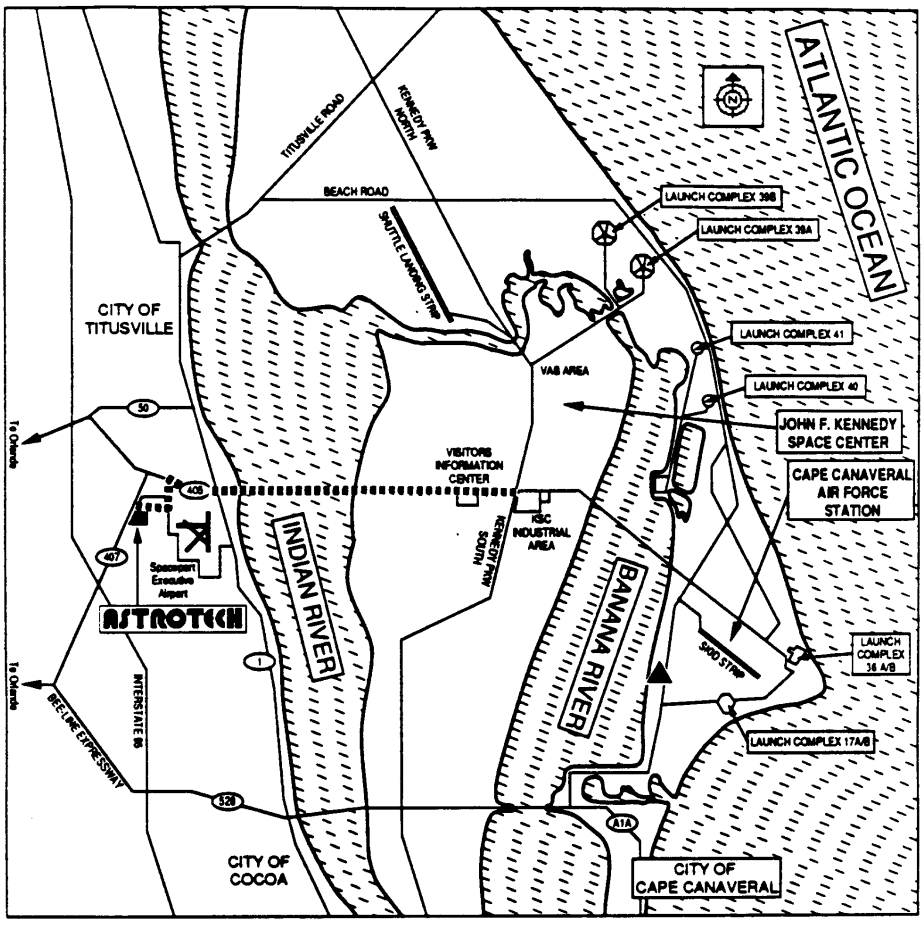

EXHIBIT 3-8 RESIDENTIAL POPULATION QUADRANTS